

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended): A method for forming a flowable dielectric layer in a semiconductor device, the method comprising the steps of:

- a) forming a plurality of patterns on a semiconductor substrate, wherein narrow and deep gaps are formed therebetween;
- b) forming a flowable dielectric layer ~~so as to fill the gaps between the patterns~~
~~wherein step b) is carried out at a temperature in a range of about -10 °C -to about 150 °C under a pressure ranging from about 10 mTorr to about 100 Torr, wherein a reaction source uses a mixture gas of SiH_x(CH₃)_y (0≤ x ≤ 4, 0≤ y ≤ 4), H₂O₂, O₂, H₂O and N₂O;~~
- c) carrying out an annealing process for densifying the flowable dielectric layer and removing moisture therein;
- d) forming a plurality of contact holes by selectively etching the flowable dielectric layer so as to expose predetermined portions of the semiconductor substrate;
- e) forming a barrier layer on sidewalls of the contact holes for preventing micro-pores in the flowable dielectric layer;
- f) carrying out a cleaning process in order to remove native oxides and defects on the semiconductor substrate; and
- g) forming a plurality of contact plugs by filling a conductive material into the contact plugs.

Claim 2 (Original): The method as recited in claim 1, wherein the step e) includes the steps of:

- e1) forming an insulating layer over the resultant structure; and
- e2) carrying out a dry etching so as to form spacers on the sidewalls of the contact holes.

Claim 3 (Original): The method as recited in claim 2, wherein the step e2) is carried out by using a blanket etch process.

Claim 4 (Original): The method as recited in claim 1, wherein the barrier layer employs a material selected from the group consisting of a silicon oxide, a silicon nitride and a silicon carbide.

Claim 5 (Currently Amended): The method as recited in claim 1, wherein the barrier layer is formed with a thickness in a range of about 20 °C-to about 300 °C.

Claim 6 (Original): The method as recited in claim 1, after the step d), further comprising the step of carrying out a pre-cleaning process for removing native oxides and the other impurities.

Claim 7 (Currently Amended): The method as recited in claim 1, wherein the step c) is carried out in a furnace at a temperature in a range of about 300 °C- to about 1,000 °C.

Claim 8 (Original): The method as recited in claim 1, wherein the step b0 is carried out by using a spin on dielectric (SOD) selected from the group consisting of a silicate, a siloxane, a methyl SilsesQuioxane (MSQ), a hydrogen SisesQuioxane(HSQ), an MSQ/HSQ, a perhydrosilazane (TCPS) or a polysilazane.

Claim 9 (Canceled)